

Service Information

1992 - 01 - 17

VR 92-01

VR202/13
VR302/01/13
VR305/01

Video recording

- GB** For sets starting from WD code 40, new Single-Chip Signal Electronic system (PMS51/01/02) is introduced to replace the 5V Signal Electronic system (PS,PMS).
- D** Für Geräte ab WD-Code 40 wird eine neue Single-Chip Signalelektronik (PMS51/01/02) statt der 5V-Signalelektronik (PS,PMS) eingeführt.
- F** Pour les appareils à partir du code WD 40, une nouvelle électronique signalétique de puce unique est mise en service (PMS51/01/02) au lieu de l'électronique signalétique 5V (PS,PMS).
- NL** Voor apparaten vanaf WD-code 40 wordt een nieuwe single chip signal elelctronic (PMS 51/01/02) i.p.v. de 5V-signal electronic (PS,PMS) ingevoerd.
- I** Per apparecchi a partire dal codice WD 40 viene introdotto un nuovo pannello segnali Single-Chip (PMS51/01/02) invece del pannello segnali (PS,PMS).
- E** Para aparatos a partir del código WD 40 viene introducido un nuevo panel de señales Single-Chip (PMS51/01/02) en lugar del panel de seales (PS,PMS).

Circuit description PMS51 (Single chip signal electronics)

1. General

The PMS51/xx series are the successors of PS and PMS.

Boards with extension /01 are for PAL, /02 are for PAL/SECAM BG.

Heart of the circuit is the IC LA7391A containing all luminance, PAL chroma and SECAM BG chroma circuits in 42 pin shrinked dil case.

The SECAM BG detector is the LA 7311 discriminator.

CCD 1H delay line is the MSM 7403RS with 5V only supply.

Minor functions have the AN 3319 S as FM AGC the LM 339 as open collector switch in the luminance video processing and the LM393.

2. Record signal path

2.1 Luminance

Pin 37 is the input of the video signal with about 1Vpp. It is then controlled by an AGC amplifier (adjustment via pin 39, time constants pin 38 and pin 16), passes a 6 dB attenuator, a 3.5 MHz low pass filter, a clamp, some switches in the noise canceller/dropout compensator part and is output via an amplifier on pin 3. The signal then goes to an emitter follower, a low pass filter and a second emitter follower to pin 4.

You have to adjust the E/E Level pot to obtain 0.5Vpp on this pin with a 100% white picture. This is necessary for the right values on pin 34 video out and the values of the white and dark clip levels.

Following the signal on pin 4 now without chrominance components it passes a clamp, a detail enhancer (time constant pin 8), a nonlinear emphasis (time constant pin 7, on/off is controlled by the DC level on pin 7) and the main emphasis with internal white and dark clip (time constants between pin 5 and 6).

The signal then goes via the deviation potmeter to pin 42 of the input of the FM modulator. The FM is then filtered, adjusted by the FM record current pot and goes to the summing stage and the head amplifier.

The loop through path outputs the signal via a feedback clamp and an insert stage (control pin 33) to pin 34 and via an emitter follower to the I/O part of the VCR.

2.2 Chrominance PAL

After the in 2.1 mentioned 6dB attenuator the signal also comes to the 4.43MHz Bandpass filter, an ACC (Automatic Chroma Control time constant pin 14), the main converter, a 1 Mhz low pass filter, a killer stage to pin 15 and via the chroma record current to the summing stage.

The 5.06 MHz for the main converter comes via the 5.06 MHz bandpass filter from the sub converter where 4.43 MHz from the VXO and 627kHz from the Line PLL is mixed.

The Line PLL is locked to the composite sync pulse from the sync separator. It uses a 321 x fH VCO (Loop filter on pin 23 and 24). The frequency is then divided by 8 in 4 different 90 degree shifted phases as it is necessary for the VHS standard. Phase shift control input is pin 41 which is also an SP/LP input.

The Line PLL part also produces the Burst Gate Pulse BGP. The VXO is locked to the incoming burst signal via the record APC detector (Loop filter pin 17).

This IC uses a special crystal for which no adjustment is necessary. An additional frequency doubler with the output on pin 21 supplies the 8.86 MHz for the CCD.

The H/2 frequency is taken from pin 17. It is the information about the phase of chroma for making color inserts on teletext boards possible in the correct phase (option).

2.3 Chrominance SECAM BG

Pin 27 H forces the IC to SECAM BG mode (Phase rotation off, VXO fixed frequency, filter characteristic of bandpass wider).

This information comes from the SECAM BG detector LA 7311 which works automatically in /02 versions.

3. Playback signal path

3.1 Luminance

The FM playback voltage passes the AGC amplifier AN3319S and the FM processing circuit which gives the necessary filter characteristics and is input to pin 39.

The FM then goes to a double limiter stage, a FM demodulator and a sub low pass filter. Pin 3 has a high impedance in play so the connected R/C components act as a linear deemphasis.

Pin 2 allows a correction of frequency response and the adjustment of the Y PB Level. Measuring point for this level is the output pin 34 while you play back a standard 100% white recording.

After correction of the frequency response in the external low pass filter now switched by the LM339 to a slightly different characteristic, the video passes, via pin 4, the 3.5 MHz low pass, the noise canceller and dropout compensator part.

For both functions the 1 H CCD is necessary. Pin 12 supplies the video to the CCD and pin 10 receives the signal where a Voltage Controlled Amplifier VCA adjusts automatically the gain tolerances of the CCD. For this function the capacitor of pin 9 is important.

You can check CCD function by connecting pin 2 to 5V in E/E mode and then measure on pin 32 the difference signal of 2 lines.

After the noise canceller the video passes the nonlinear deemphasis (time constant pin 7 as rec), a noise canceller (time constant pin 8), the picture control stage (controlled by DC on pin 13 2V = soft, 3V = sharp), the Y/Chroma mixing stage and the video output amp to pin 34.

3.2 Chrominance PAL

627kHz Chroma from tape goes through a 1 MHz low pass filter and an amplifier with group delay correction to pin 15 of the IC. The chroma is amplified, controlled in the ACC amplifier, mixed with 5.06 MHz and goes via the 4.43 MHz bandpass and an amplifier to the combfilter where crosstalk components from the neighbor tracks are removed.

The chroma then comes back to the IC at pin 27 where it is amplified, leaves at pin 31 and comes back again at pin 29 via an emitter follower acting as a switch for other chroma systems. Pin 29 is the input of the Y/C mixing stage.

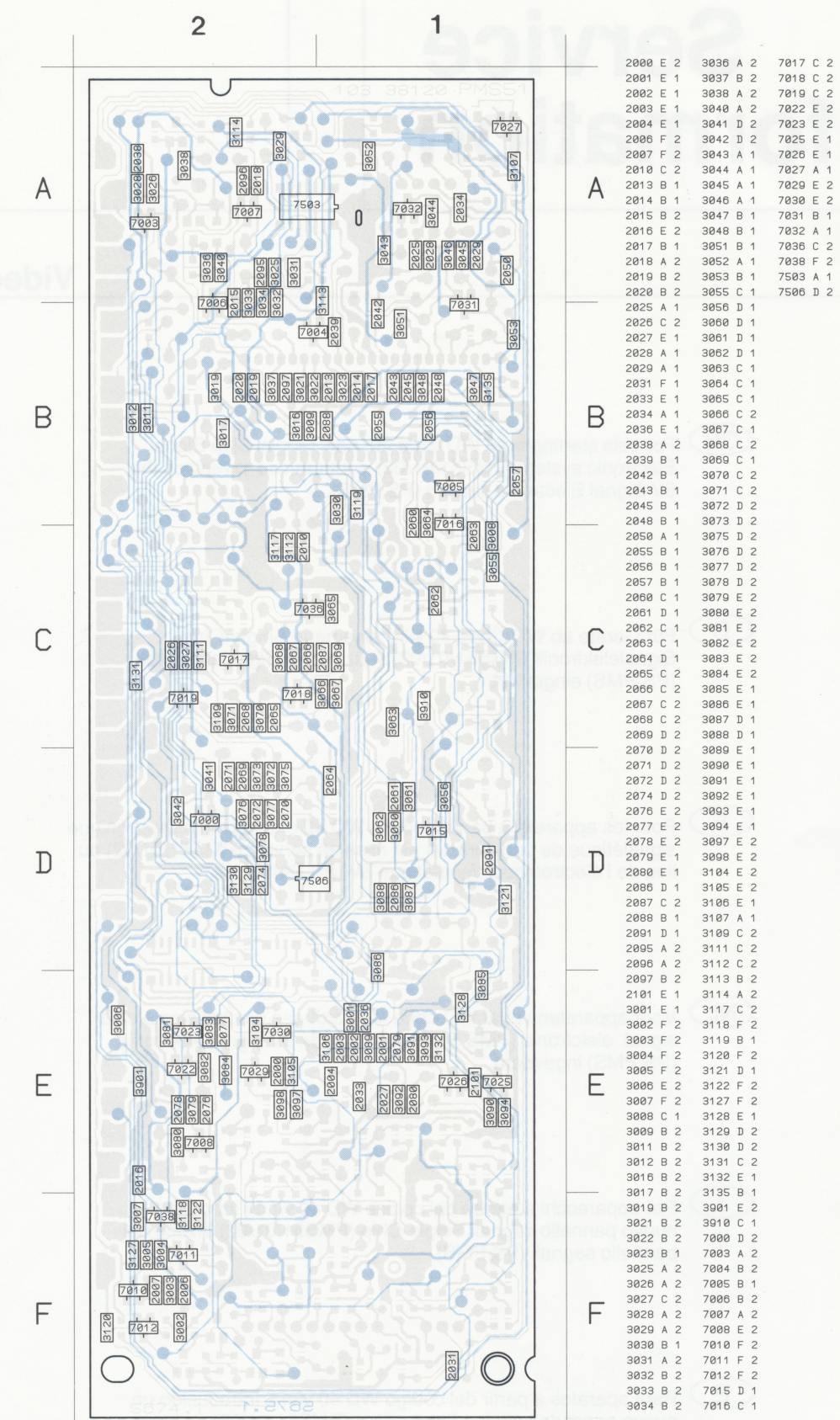
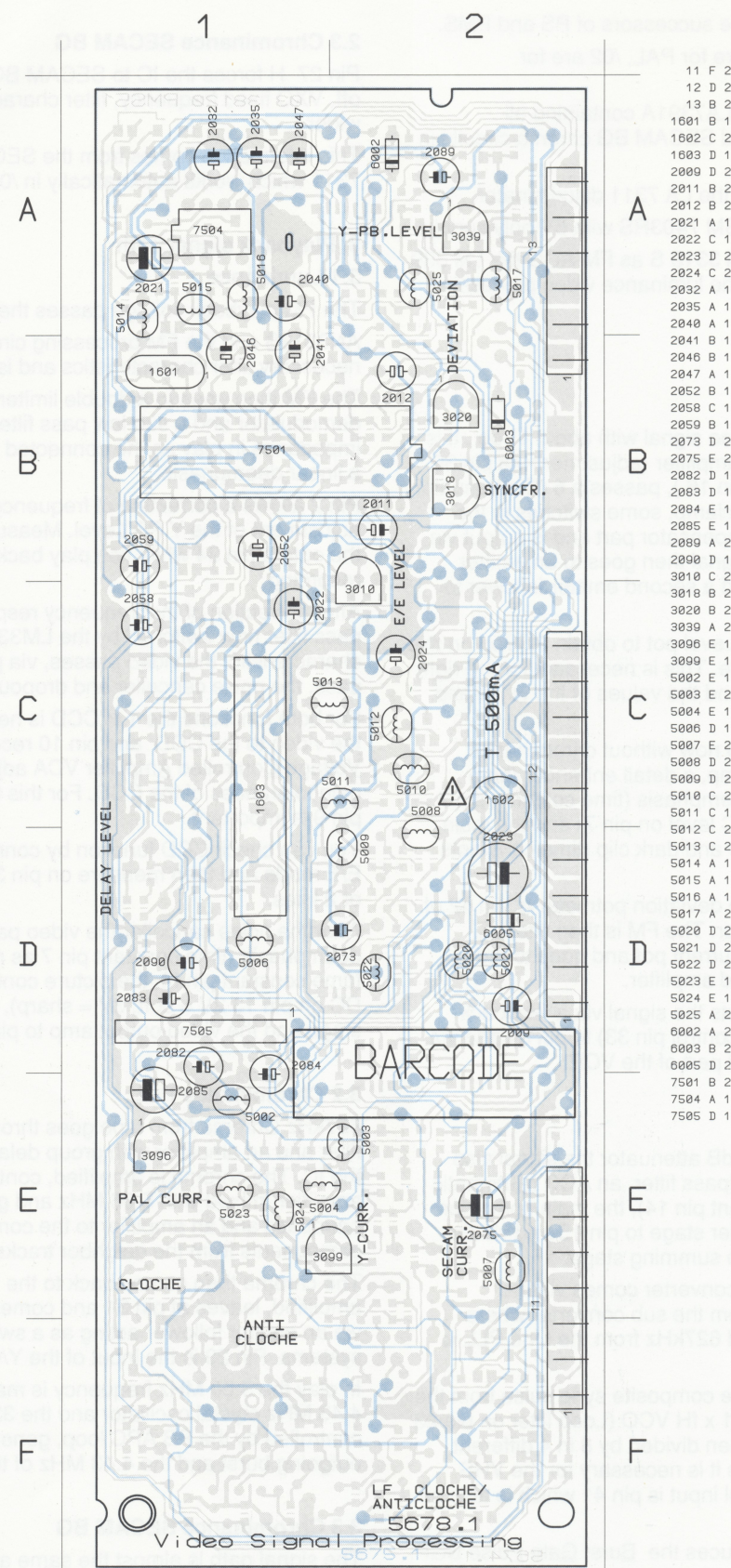
In play the 5.06 MHz frequency is made by the free running 4.43 MHz crystal oscillator and the 321 fH VCO. It is controlled by the PB APC loop, generating a signal from the outgoing burst and the 4.43 MHz of the crystal.

3.3 Chrominance SECAM BG

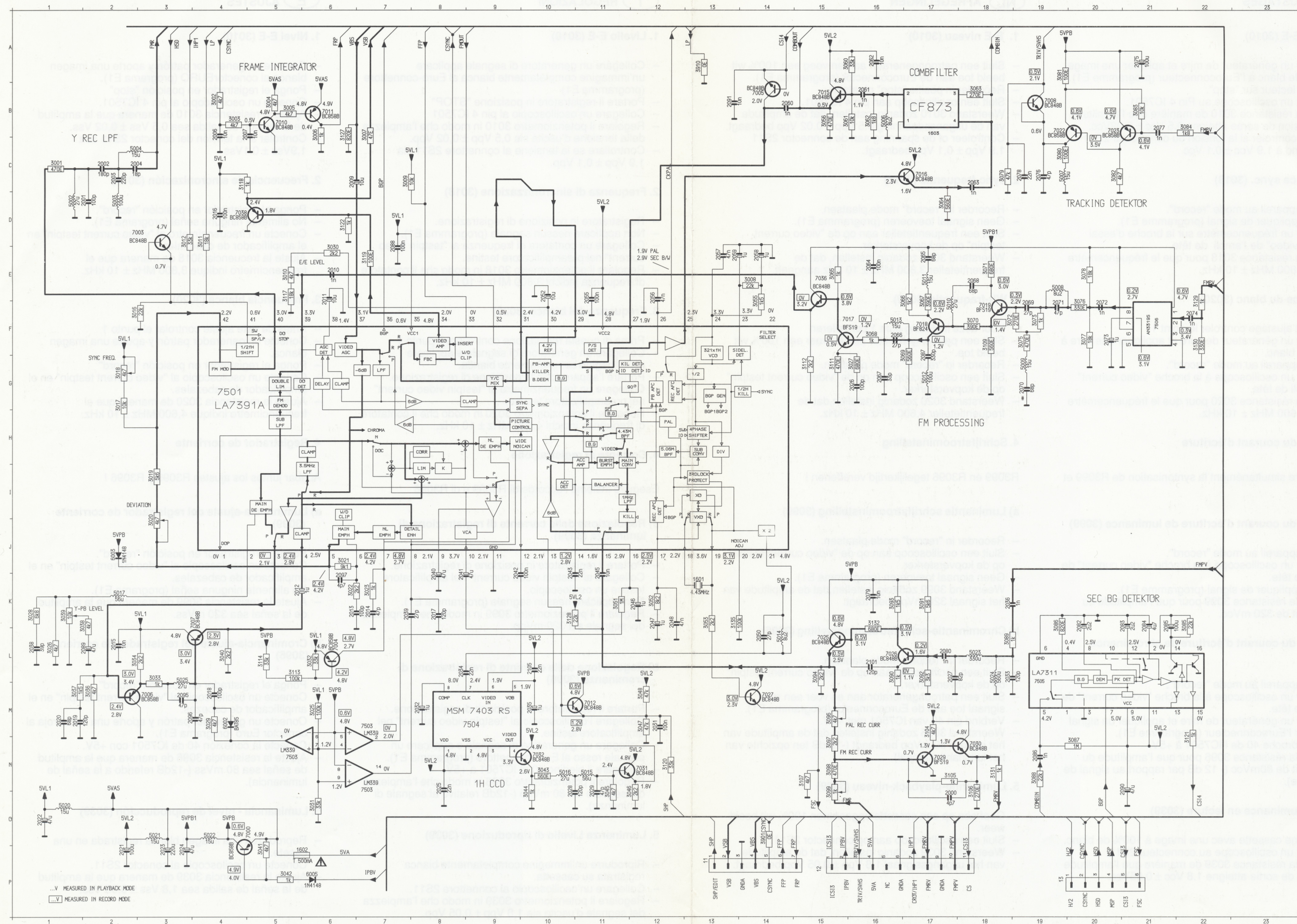
The signal path is almost the same as in PAL.

Differences are :

- 321 fH VCO locked to sync,
- no phase rotation,
- Comb filter off,
- internal bandpass filter has larger bandwidth,
- no color killer function, color always on.

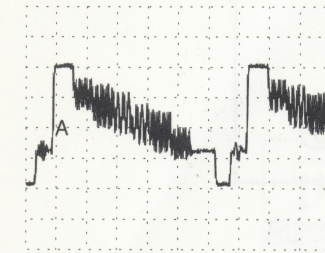


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|----------|----------|----------|
| 2000 E 2 | 3036 A 2 | 7017 C 2 |
| 2001 E 1 | 3037 B 2 | 7018 C 2 |
| 2002 E 1 | 3038 A 2 | 7019 C 2 |
| 2003 E 1 | 3040 A 2 | 7022 E 2 |
| 2004 E 1 | 3041 D 2 | 7023 E 2 |
| 2006 F 2 | 3042 D 2 | 7025 E 1 |
| 2007 F 2 | 3043 A 1 | 7026 E 1 |
| 2010 C 2 | 3044 A 1 | 7027 A 1 |
| 2013 B 1 | 3045 A 1 | 7029 E 2 |
| 2014 B 1 | 3046 A 1 | 7030 E 2 |
| 2015 B 2 | 3047 B 1 | 7031 B 1 |
| 2016 E 2 | 3048 B 1 | 7032 A 1 |
| 2017 B 1 | 3051 B 1 | 7036 C 2 |
| 2018 A 2 | 3052 A 1 | 7038 F 2 |
| 2019 B 2 | 3053 B 1 | 7503 A 1 |
| 2020 B 2 | 3055 C 1 | 7506 D 2 |
| 2025 A 1 | 3056 D 1 | |
| 2026 C 2 | 3060 D 1 | |
| 2027 E 1 | 3061 D 1 | |
| 2028 A 1 | 3062 D 1 | |
| 2029 A 1 | 3063 C 1 | |
| 2031 F 1 | 3064 C 1 | |
| 2033 E 1 | 3065 C 1 | |
| 2034 A 1 | 3066 C 2 | |
| 2036 E 1 | 3067 C 1 | |
| 2038 A 2 | 3068 C 2 | |
| 2039 B 1 | 3069 C 1 | |
| 2042 B 1 | 3070 C 2 | |
| 2043 B 1 | 3071 C 2 | |
| 2045 B 1 | 3072 D 2 | |
| 2048 B 1 | 3073 D 2 | |
| 2050 A 1 | 3075 D 2 | |
| 2055 B 1 | 3076 D 2 | |
| 2056 B 1 | 3077 D 2 | |
| 2057 B 1 | 3078 D 2 | |
| 2060 C 1 | 3079 E 2 | |
| 2061 D 1 | 3080 E 2 | |
| 2062 C 1 | 3081 E 2 | |
| 2063 C 1 | 3082 E 2 | |
| 2064 D 1 | 3083 E 2 | |
| 2065 C 2 | 3084 E 2 | |
| 2066 C 2 | 3085 E 1 | |
| 2067 C 2 | 3086 E 1 | |
| 2068 C 2 | 3087 D 1 | |
| 2069 D 2 | 3088 D 1 | |
| 2070 D 2 | 3089 E 1 | |
| 2071 D 2 | 3090 E 1 | |
| 2072 D 2 | 3091 E 1 | |
| 2074 D 2 | 3092 E 1 | |
| 2076 E 2 | 3093 E 1 | |
| 2077 E 2 | 3094 E 1 | |
| 2078 E 2 | 3097 E 2 | |
| 2079 E 1 | 3098 E 2 | |
| 2080 E 1 | 3104 E 2 | |
| 2086 D 1 | 3105 E 2 | |
| 2087 C 2 | 3106 E 1 | |
| 2088 B 1 | 3107 A 1 | |
| 2091 D 1 | 3109 C 2 | |
| 2095 A 2 | 3111 C 2 | |
| 2096 A 2 | 3112 C 2 | |
| 2097 B 2 | 3113 B 2 | |
| 2101 E 1 | 3114 A 2 | |
| 3001 E 1 | 3117 C 2 | |
| 3002 F 2 | 3118 F 2 | |
| 3003 F 2 | 3119 B 1 | |
| 3004 F 2 | 3120 F 2 | |
| 3005 F 2 | 3121 D 1 | |
| 3006 E 2 | 3122 F 2 | |
| 3007 F 2 | 3127 F 2 | |
| 3008 C 1 | 3128 E 1 | |
| 3009 B 2 | 3129 D 2 | |
| 3011 B 2 | 3130 D 2 | |
| 3012 B 2 | 3131 C 2 | |
| 3016 B 2 | 3132 E 1 | |
| 3017 B 2 | 3135 B 1 | |
| 3019 B 2 | 3091 E 2 | |
| 3021 B 2 | 3910 C 1 | |
| 3022 B 2 | 7000 D 2 | |
| 3023 B 1 | 7003 A 2 | |
| 3025 A 2 | 7004 B 2 | |
| 3026 A 2 | 7005 B 1 | |
| 3027 C 2 | 7006 B 2 | |
| 3028 A 2 | 7007 A 2 | |
| 3029 A 2 | 7008 E 2 | |
| 3030 B 1 | 7010 F 2 | |
| 3031 A 2 | 7011 F 2 | |
| 3032 B 2 | 7012 F 2 | |
| 3033 B 2 | 7015 D 1 | |
| 3034 B 2 | 7016 C 1 | |



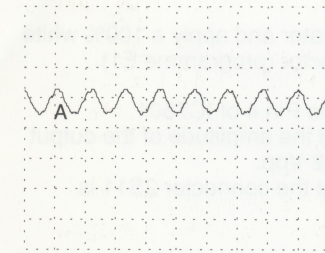
OSCILLOGRAMS SIGNALELECTRONIC
UNLESS OTHERWISE INDICATED MEASURED IN POSITION RECORD

A: DC, 0.5 V/Div, 10 us/Div



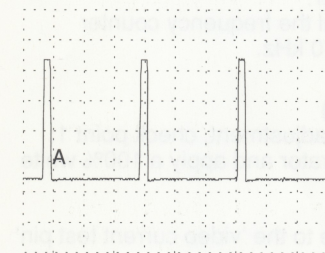
Connector B11 Pin 2
VSB

A: DC, 0.5 V/Div, 0.2 us/Div



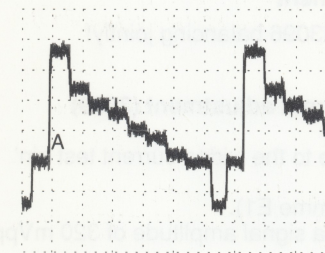
Connector B13 Pin 6
FSC

A: DC, 1.0 V/Div, 20 us/Div



IC 7501 Pin 32

A: AC, 0.1 V/Div, 10 us/Div



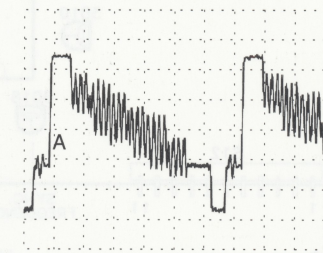
IC 7501 Pin 10
(Measured in Playback)

A: DC, 0.5 V/Div, 10 us/Div



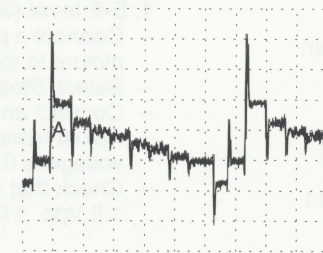
IC 7501 Pin 25
(Measured in Playback)

A: AC, 0.2 V/Div, 10 us/Div



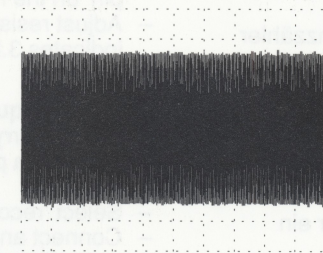
Connector B11 Pin 4
VBS

A: DC, 0.2 V/Div, 10 us/Div



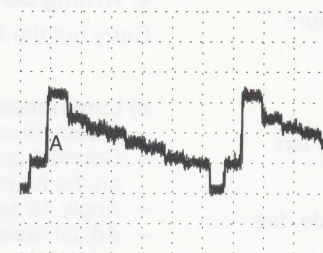
IC 7501 Pin 5

A: AC, 0.2 V/Div, 2 us/Div



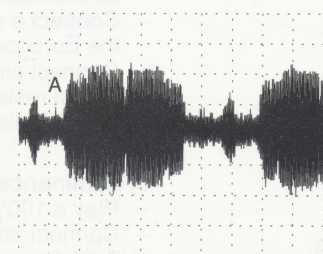
IC 7501 Pin 40

A: AC, 0.1 V/Div, 10 us/Div



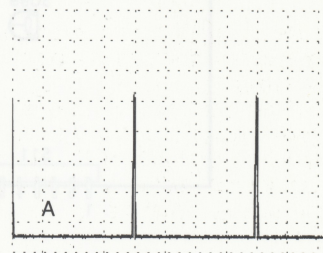
IC 7501 Pin 12
(Measured in Playback)

A: AC, 50 mV/Div, 5 ms/Div



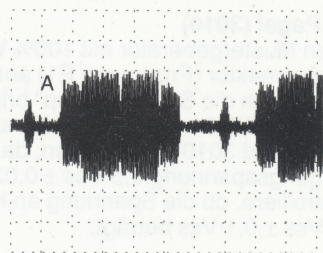
IC 7501 Pin 27
(Measured in Playback)

A: DC, 0.5 V/Div, 5 ms/Div



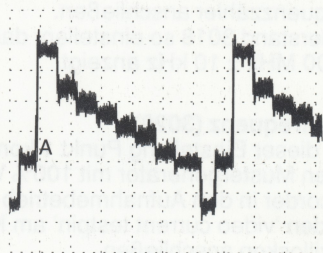
Connector B11 Pin 7
FRP

A: AC, 0.1 V/Div, 10 us/Div



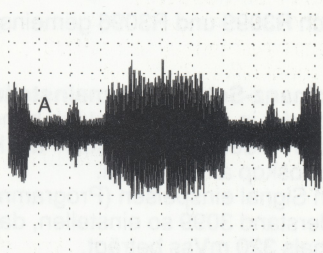
IC 7501 Pin 15

A: AC, 0.1 V/Div, 10 us/Div



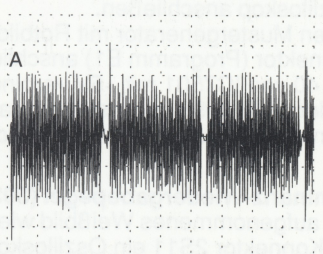
IC 7501 Pin 3
(Measured in Playback)

A: AC, 0.2 V/Div, 10 us/Div

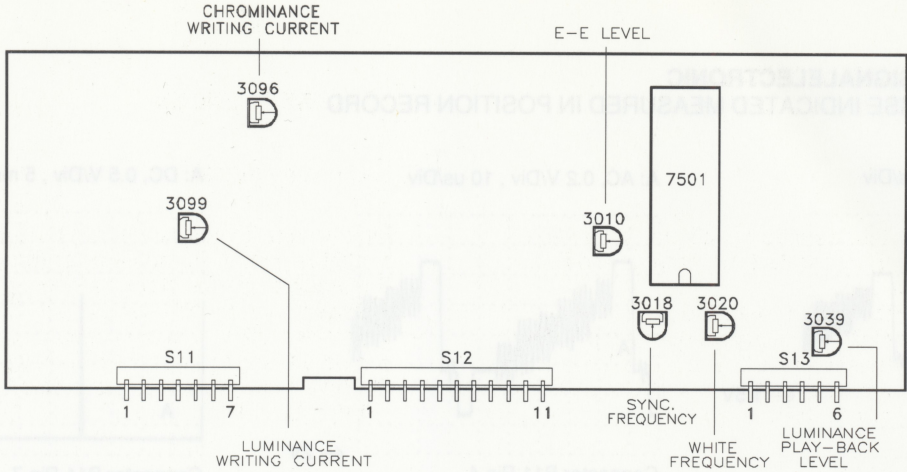


IC 7501 Pin 15
(Measured in Playback)

A: AC, 50 mV/Div, 20 us/Div



IC 7501 Pin 39
(Measured in Playback)



D EINSTELLUNGEN

- 1. E-E Pegel (3010)**
- Einen Mustergenerator mit 100% Weißbild an den Eurokonnektor (Programm E1) anschließen.
 - Recorder in die Stellung "Stop" bringen.
 - An Pin 4 IC7501 ein Oszilloskop anschließen.
 - Widerstand 3010 so einstellen, daß die Ausgangsspannung 0,5 Vss ± 0,02 Vss beträgt.
 - Kontrolliere, ob die Spannung an Konnektor 2S11 1,9 Vss ± 0,1 Vss beträgt.

- 2. Synchpegelfrequenz (3018)**
- Recorder in Aufnahmebetrieb bringen.
 - Kein Signal einspeisen (Programm E1).
 - An den 'video current testpin' am Kopfverstärker einen Frequenzzähler anschließen.
 - Widerstand 3018 so einstellen, daß der Frequenzzähler 3,800 MHz ± 10 kHz anzeigt.

- 3. Weißfrequenz (3020)**
- Vor dieser Einstellung Punkt 1 kontrollieren.
 - Einen Mustergenerator mit 100% Weißbild anschließen.
 - Recorder in den Aufnahmebetrieb bringen.
 - An den 'video current testpin' am Kopfverstärker ein Oszilloskop anschließen.
 - Widerstand 3020 so einstellen, daß der Frequenzzähler 4,600 MHz ± 10 kHz anzeigt.

- 4. Schreibstromeinstellung**
- Abgleich R3099 und R3096 gemeinsam durchführen !

- a) Luminanz-Schreibstromeinstellung (3099)**
- Recorder in Aufnahmebetrieb bringen.
 - An den 'video current testpin' am Kopfverstärker ein Oszilloskop anschließen.
 - Kein Signal einspeisen (Programm E1).
 - Widerstand 3099 so einstellen, daß die Amplitude des Signals 320 mVss beträgt.

- b) Chrominanz-Schreibstromeinstellung (3096)**
- Recorder in den Aufnahmebetrieb bringen.
 - An den 'video current testpin' am Kopfverstärker ein Oszilloskop anschließen.
 - Einen Mustergenerator mit Rotbild an den Euro-konnektor (Programm E1) anschließen.
 - Pin 40 von IC7501 mit +5V verbinden.
 - Widerstand 3096 so einstellen, daß die Amplitude des Signals 80 mVss beträgt (-12 dB des Luminanzsignals).

- 5. Luminanz-Wiedergabepiegel (3039)**
- Ein aufgenommenes Weißbild wiedergeben.
 - An Konnektor 2S11 ein Oszilloskop anschließen.
 - Widerstand 3039 so einstellen, daß die Amplitude des Ausgangssignals 1,8 Vss ± 0,05 Vss beträgt.

GB ADJUSTMENTS

- 1. E-E level (3010)**
- Connect a pattern generator and apply a 100% white picture to the Euroconnector (programme E1).
 - Select 'Stop' mode.
 - Connect an oscilloscope to Pin 4 of IC7501.
 - Adjust resistor 3010 until the amplitude of the output voltage is 0.5 Vpp ± 0.02 Vpp.
 - Check that the voltage at the connector 2S11 is 1.9 Vpp ± 0.1 Vpp.

- 2. Sync frequency (3018)**
- Select 'record' mode.
 - Apply no signal (programme E1).
 - Connect a frequency counter to the 'video current test pin' on the head amplifier.
 - Adjust resistor 3018 until the frequency counter indicates 3.800 MHz ± 10 kHz.

- 3. White frequency (3020)**
- Before carrying out this adjustment, check point 1.
 - Connect a pattern generator and apply a 100% white picture.
 - Select 'record' mode.
 - Connect an oscilloscope to the 'video current test pin' on the head amplifier.
 - Adjust resistor 3020 until the frequency counter reads 4.600 MHz ± 10 kHz.

- 4. Writing current adjustment**
- Carry out the R3099 and R3096 balancing jointly!

- a) Luminance writing current adjustment (3099)**
- Select 'record' mode.
 - Connect an oscilloscope to the 'video current test pin' on the head amplifier.
 - Apply no signal (programme E1).
 - Adjust resistor 3099 for a signal amplitude of 320 mVpp.

- b) Chrominance writing current adjustment (3096)**
- Select 'record' mode.
 - Connect an oscilloscope to the 'video current test pin' on the head amplifier.
 - Connect a pattern generator and apply a red signal to the Euroconnector (programme E1).
 - Connect pin 40 of IC7501 to + 5V.
 - Adjust resistor 3096 for a signal amplitude of 80 mVpp (-12 dB relative to the luminance signal).

- 5. Luminance playback level (3039)**
- Play a 100% white picture from a cassette.
 - Connect an oscilloscope to connector 2S11.
 - Adjust resistor 3039 until the amplitude of the output signal is 1.8 Vpp ± 0.05 Vpp.

F AJUSTAGES

- 1. Niveau E-E (3010)**
- Brancher un générateur de mire et appliquer une image à 100% de blanc à l'Euroconnecteur (programme E1).
 - Mettre le lecteur sur "stop".
 - Brancher un oscilloscope au Pin 4 IC7501.
 - Ajuster la résistance 3010 de manière que l'amplitude de la tension de sortie atteigne 0.5 Vcc ± 0.02Vcc.
 - Veillez à contrôler si la tension du connecteur 2S11 correspond à 1.9 Vcc ± 0.1 Vcc

- 2. Fréquence sync. (3018)**
- Mettre l'appareil au mode "record".
 - Ne pas appliquer de signal (programme E1).
 - Brancher un fréquencesmètre sur la broche d'essai "courant video" de l'ampli de tête.
 - Ajuster la résistance 3018 pour que le fréquencesmètre affiche 3.800 MHz ± 10 kHz.

- 3. Fréquence du blanc (3020)**
- Avant cet ajustage contrôler le point 1
 - Brancher un générateur de mire et appliquer une mire à 100% de blanc.
 - Mettre l'appareil au mode "record".
 - Brancher un oscilloscope à la broche "video current" sur l'ampli de tête.
 - Ajuster la résistance 3020 pour que le fréquencesmètre affiche 4.600 MHz ± 10 kHz.

- 4. Réglage du courant d'écriture**

Veillez à faire simultanément la syntonisation de R3099 et R3096 !

- a) Réglage du courant d'écriture de luminance (3099)**
- Mettre l'appareil au mode "record".
 - Brancher un oscilloscope à la broche "video current" de l'ampli de tête.
 - Ne pas appliquer de signal (programme E1).
 - Ajuster la résistance 3099 pour que l'amplitude du signal soit de 320 mVcc.

- b) Réglage du courant d'écriture de chrominance (3096)**
- Mettre l'appareil au mode "record".
 - Brancher un oscilloscope à la broche "video current" de l'ampli de tête.
 - Brancher un générateur de mire et appliquer un signal rouge sur l'Euroconnecteur (programme E1).
 - Relier la broche 40 de l'IC7501 à +5V.
 - Ajuster la résistance 3096 pour que l'amplitude du signal soit de 80mVcc (- 12 dB par rapport au signal de luminance).

- 5. Niveau luminance en lecture (3039)**
- Passer une cassette avec une image à 100% de blanc.
 - Brancher un oscilloscope au connecteur 2S11.
 - Ajuster la résistance 3039 de manière que l'amplitude du signal de sortie atteigne 1.8 Vcc ± 0.05Vcc.

NL AFREGELINGEN

- 1. E-E niveau (3010)**
- Sluit een patroongenerator aan en voeg een 100% wit beeld toe aan de Euroconnector (programma E1).
 - Recorder in positie "stop" plaatsen.
 - Sluit een oscilloscoop aan pin 4 IC7501.
 - Weerstand 3010 zodanig instellen, dat de amplitude van de uitgangsspanning 0.5 Vpp ± 0.02 Vpp bedraagt.
 - Controleer of de spanning aan de connector 2S11 1.9 Vpp ± 0,1 Vpp bedraagt.

- 2. Sync-frequentie (3018)**
- Recorder in "record" mode plaatsen.
 - Geen signaal toevoeren (programma E1).
 - Sluit een frequentieteller aan op de "video current testpin" op de kopverstekker.
 - Weerstand 3018 zodanig instellen, dat de frequentieteller 3.800 MHz ± 10 kHz aangeeft.

- 3. Wit-frequentie (3020)**
- Voor deze instelling punt 1 controleren
 - Sluit een patroongenerator aan en voer een 100% wit beeld toe.
 - Recorder in "record" mode plaatsen.
 - Sluit een oscilloscoop aan op de "video current testpin" op de kopverstekker.
 - Weerstand 3020 zodanig instellen, dat de frequentieteller 4.600 MHz ± 10 kHz.

- 4. Schrijfstroominstelling**

R3099 en R3096 tegelijkertijd vereffenen !

- a) Luminantie schrijfstroominstelling (3099)**
- Recorder in "record" mode plaatsen.
 - Sluit een oscilloscoop aan op de "video current testpin" op de kopverstekker.
 - Geen signaal toevoeren (programma E1).
 - Weerstand 3099 zodanig instellen, dat de amplitude van het signaal 320 mVpp bedraagt.

- b) Chrominantie-schrijfstroominstelling (3096)**
- Recorder in "record" mode plaatsen.
 - Sluit een oscilloscoop aan op de "video current testpin" op de kopverstekker.
 - Sluit een patroongenerator aan en voer een rood signaal toe aan de Euroconnector (programma E1).
 - Verbind pin 40 van IC7501 met +5V.
 - Weerstand 3096 zodanig instellen, dat de amplitude van het signaal 80 mVpp bedraagt (-12 dB ten opzichte van het luminantiesignaal).

- 5. Luminantie-playback-niveau (3039)**
- Geef een op een cassette opgenomen 100% wit beeld weer.
 - Sluit een oscilloscoop aan op connector 2S11.
 - Weerstand 3039 zodanig instellen, dat de amplitude van het uitgangssignaal 1.8 Vpp ± 0.05 Vpp bedraagt.

I REGOLAZIONI

- 1. Livello E-E (3010)**
- Collegare un generatore di segnale applicare un'immagine completamente bianca al Euro-connettore (programma E1)
 - Portare il registratore in posizione "STOP"
 - Collegare un'oscilloscopio al pin 4 IC7501
 - Regolare il potenziometro 3010 in modo che l'ampiezza della tensione d'uscita sia 0,5 Vpp ± 0,02 Vpp.
 - Controllare se la tensione al connettore 2S11 sia 1,9 Vpp ± 0,1 Vpp.

- 2. Frequenza di sincronizzazione (3018)**
- Registratore in posizione di registrazione.
 - Non applicare nessun segnale (programma E1).
 - Collegare un contatore di frequenza al "testpin video current" nel preamplificatore testine.
 - Regolare il potenziometro 3018 in modo che il contatore di frequenza indichi 3,800 MHz ± 10 kHz.

- 3. Frequenza del bianco (3020)**
- Prima di questa regolazione controllare il punto 1
 - Collegare un generatore di segnale e applicare un'immagine completamente bianca.
 - Portare l'apparecchio in posizione di registrazione.
 - Collegare un frequenzimetro al "testpin video current" nel preamplificatore testine.
 - Regolare il potenziometro 3020 in modo che il contatore di frequenza indichi 4,600 MHz ± 10 kHz.

- 4. Corrente di registrazione**

Eseguire insieme l'accorde di R3099 e di R3096

- a) Regolazione della corrente di registrazione di luminanza (3099)**
- Portare il registratore in posizione di registrazione.
 - Collegare al "testpin video current" nel amplificatore testine un oscilloscopio.
 - Non applicare nessun segnale (programma E1).
 - Regolare il potenziometro 3099 in modo che l'ampiezza del segnale sia 320 mVpp.

- b) Regolazione della corrente di registrazione di crominanza (3096)**
- Portare il registratore in posizione di registrazione.
 - Collegare l'oscilloscopio al "testpin video current" nel amplificatore testine.
 - Collegare un generatore di segnale e applicare un segnale rosso al Euro-connettore (programma E1).
 - Collegare il piedino 40 di IC7501 a +5V.
 - Regolare il potenziometro 3096 in modo che l'ampiezza del segnale sia 80 mVpp (-12dB relativo al segnale di luminanza).

- 5. Luminanza Livello di riproduzione (3039)**
- Riprodurre un'immagine completamente bianca registrata su cassetta.
 - Collegare un'oscilloscopio al connettore 2S11.
 - Regolare il potenziometro 3039 in modo che l'ampiezza del segnale d'uscita sia 1,8 Vpp ± 0,05 Vpp.

E AJUSTES

- 1. Nivel E-E (3010)**
- Conecte un generador patrón y aporte una imagen blanca al conectorEURO (programa E1).
 - Ponga el registrador en posición "stop"
 - Conecte un osciloscopio al pin 4 IC7501.
 - Ajuste la resistencia 3010 de manera que la amplitud de la tensión de salida sea 0,5 Vss ± 0,02 Vss.
 - Controlar si la tensión del conector 2S11 sea 1,9Vss ± 0.1Vss

- 2. Frecuencia de sincronización (3018)**
- Ponga el registrador en posición "record".
 - No alimente ninguna señal (programa E1).
 - Conecte un frecuencímetro al "video current testpin" en el amplificador de cabezales.
 - Ajuste la frecuencia 3018 de manera que el frecuencímetro indique 3,800 MHz ± 10 kHz.

- 3. Frecuencia blanca (3020)**
- Antes de este ajuste controlar el punto 1
 - Conecte un generador patrón y aporte una imagen blanca.
 - Ponga el registrador en posición "record"
 - Conecte un osciloscopio al "video current testpin" en el amplificador de cabezales.
 - Ajuste la resistencia 3020 de manera que el frecuencímetro indique 4,600 MHz ± 10 kHz.

- 4. Registrador de corriente**
- Acabar juntos los ajustes R3099 y R3096 !

- a) Luminancia-ajuste del registrador de corriente (3099)**
- Ponga el registrador en posición "record".
 - Conecte un osciloscopio al "video current testpin" en el amplificador de cabezales.
 - No alimente ninguna señal (programa E1).
 - Ajuste la resistencia 3099 de manera que la amplitud de la señal sea 320 mVss.

- b) Crominancia-ajuste del registrador de corriente (3096)**
- Ponga el registrador en posición "record".
 - Conecte un osciloscopio al "video current testpin" en el amplificador de cabezas.
 - Conecte un generador patrón y aporte una señal roja al conector Euro (programa E1).
 - Conecte la conexión 40 de IC7501 con +5V.
 - Ajuste la resistencia 3096 de manera que la amplitud de señal sea 80 mVss (-12dB referido a la señal de luminancia).

- 5. Luminancia - nivel de reproducción (3039)**
- Reproduzca una imagen blanca registrada en una casete.
 - Conecte un osciloscopio al conector 2S11.
 - Ajuste la resistencia 3039 de manera que la amplitud de la señal de salida sea 1,8 Vss ± 0,05 Vss.

For WD code WD40 and higher

CONNECTORS

| | |
|----------------|---------|
| 4822 290 60954 | 6-FOLD |
| 4822 290 81463 | 7-FOLD |
| 4822 321 22318 | 11-FOLD |

MISCELLANEOUS

| | | |
|------|----------------|---------------|
| 1601 | 4822 242 81067 | 4.433 619 MHz |
| 1602 | 4822 071 55001 | Fuse 500mA |
| 1603 | 4822 320 40168 | Delay line |

CAPACITORS

| | | | |
|------|----------------|-------------|-----|
| 2000 | 5322 122 32287 | 4,7 pF | 50V |
| 2001 | 5322 122 32269 | 68 pF | 50V |
| 2002 | 4822 126 10326 | 180 pF | |
| 2003 | 4822 122 32575 | 220 pF | 50V |
| 2004 | 5322 122 32965 | 18 pF | 50V |
| 2006 | 4822 122 33177 | 10 nF | 50V |
| 2007 | 4822 122 33177 | 10 nF | 50V |
| 2009 | 4822 124 40435 | 10 μ F | 50V |
| 2010 | 5322 122 34123 | 1 nF | 50V |
| 2011 | 4822 124 40435 | 10 μ F | 50V |
| 2012 | 4822 124 42006 | 1 μ F | 50V |
| 2013 | 5322 122 32531 | 100 pF | 50V |
| 2014 | 5322 122 32452 | 47 pF | 50V |
| 2015 | 4822 122 33177 | 10 nF | 50V |
| 2016 | 4822 122 31947 | 100 nF | 63V |
| 2017 | 4822 126 10004 | 120 pF | 63V |
| 2018 | 5322 122 32531 | 100 pF | 50V |
| 2019 | 4822 126 10004 | 120 pF | 63V |
| 2020 | 5322 122 32269 | 6,8 pF | 50V |
| 2021 | 4822 124 41643 | 100 μ F | 16V |
| 2022 | 4822 124 41506 | 47 μ F | 16V |
| 2023 | 4822 124 22263 | 220 μ F | 16V |
| 2024 | 4822 124 41506 | 47 μ F | 16V |
| 2025 | 5322 122 32654 | 22 nF | 63V |
| 2026 | 5322 122 32531 | 100 pF | 50V |
| 2027 | 4822 122 33515 | 82 pF | 63V |
| 2028 | 4822 126 10004 | 120 pF | 63V |
| 2029 | 5322 122 32452 | 47 pF | 50V |
| 2031 | 4822 122 31947 | 100 nF | 63V |
| 2032 | 4822 124 40242 | 1 μ F | 63V |
| 2033 | 4822 126 10004 | 120 pF | 63V |
| 2034 | 5322 122 32654 | 22 nF | 63V |
| 2035 | 4822 124 40242 | 1 μ F | 63V |
| 2036 | 5322 122 34123 | 1 nF | 50V |
| 2038 | 5322 122 32966 | 39 pF | 50V |
| 2039 | 5322 122 31946 | 27 pF | 50V |
| 2040 | 4822 124 41506 | 47 μ F | 16V |
| 2041 | 4822 124 41506 | 47 μ F | 16V |
| 2042 | 4822 122 31947 | 100 nF | 63V |
| 2043 | 5322 122 32654 | 22 nF | 63V |
| 2045 | 4822 122 33177 | 10 nF | 50V |
| 2046 | 4822 124 40242 | 1 μ F | 63V |
| 2047 | 4822 124 40242 | 1 μ F | 63V |
| 2048 | 4822 122 32542 | 47 nF | 63V |
| 2050 | 5322 122 31946 | 27 pF | 50V |
| 2052 | 4822 124 40435 | 10 μ F | 50V |
| 2055 | 4822 122 31947 | 100 nF | 63V |
| 2056 | 4822 122 32542 | 47 nF | 63V |
| 2057 | 4822 122 32542 | 47 nF | 63V |
| 2058 | 4822 124 40242 | 1 μ F | 63V |
| 2059 | 4822 124 40242 | 1 μ F | 63V |
| 2060 | 5322 122 34123 | 1 nF | 50V |
| 2061 | 5322 122 34123 | 1 nF | 50V |
| 2062 | 4822 122 33177 | 10 nF | 50V |
| 2063 | 5322 122 34123 | 1 nF | 50V |

| | | | |
|------|----------------|-------------|----------------------|
| 2064 | 4822 122 31947 | 100 nF | 63V |
| 2065 | 5322 122 32269 | 6,8 pF | 50V |
| 2066 | 5322 122 31946 | 27 pF | 50V |
| 2067 | 5322 122 32659 | 33 pF | 50V |
| 2068 | 5322 122 32269 | 6,8 pF | 50V |
| 2069 | 5322 122 31946 | 27 pF | 50V |
| 2070 | 5322 122 32269 | 6,8 pF | 50V |
| 2071 | 5322 122 32452 | 47 pF | 50V |
| 2072 | 5322 122 34123 | 1 nF | 50V |
| 2073 | 4822 124 40242 | 1 μ F | 63V |
| 2074 | 5322 122 34123 | 1 nF | 50V |
| 2075 | 4822 124 41643 | 100 μ F | 16V |
| 2076 | 5322 122 32452 | 47 pF | 50V |
| 2077 | 5322 122 34123 | 1 nF | 50V |
| 2078 | 5322 122 32654 | 22 nF | 63V |
| 2079 | 4822 122 33177 | 10 nF | 50V |
| 2080 | 5322 122 34123 | 1 nF | 50V |
| 2082 | 4822 124 41576 | 2,2 μ F | 50V (only for SECAM) |
| 2083 | 4822 124 41576 | 2,2 μ F | 50V (only for SECAM) |
| 2084 | 4822 124 41577 | 4,7 μ F | 50V (only for SECAM) |
| 2085 | 4822 124 41643 | 100 μ F | 16V (only for SECAM) |
| 2086 | 5322 122 34123 | 1 nF | 50V (only for SECAM) |
| 2087 | 5322 122 31863 | 330 pF | 50V |
| 2088 | 4822 122 31947 | 100 nF | 63V |
| 2089 | 4822 124 41506 | 47 μ F | 16V |
| 2090 | 4822 124 41506 | 47 μ F | 16V (only for SECAM) |
| 2091 | 4822 122 33177 | 10 nF | 50V (only for SECAM) |
| 2095 | 5322 122 32452 | 47 pF | 50V |
| 2096 | 5322 122 32452 | 47 pF | 50V |
| 2097 | 5322 122 32287 | 4,7 pF | 50V |
| 2101 | 4822 126 10004 | 120 pF | 63V |
| 2105 | 5322 122 32654 | 22 nF | 63V |
| 2106 | 5322 122 32481 | 15 pF | 50V |

RESISTORS

| | | | |
|------|----------------|----------------|-------|
| 3001 | 4822 051 20471 | 470 Ω | 0,1W |
| 3002 | 4822 051 20472 | 4,7 k Ω | 0,1W |
| 3003 | 4822 051 20472 | 4,7 k Ω | 0,1W |
| 3004 | 4822 051 20472 | 4,7 k Ω | 0,1W |
| 3005 | 4822 051 20472 | 4,7 k Ω | 0,1W |
| 3006 | 4822 051 10102 | 1 k Ω | 0,25W |
| 3007 | 4822 051 20479 | 47 Ω | 0,1W |
| 3008 | 4822 051 20223 | 22 k Ω | 0,1W |
| 3009 | 4822 051 20103 | 10 k Ω | 0,1W |
| 3010 | 4822 100 11842 | 4,7 k Ω | |
| 3011 | 4822 051 20183 | 18 k Ω | 0,1W |
| 3012 | 4822 051 20333 | 33 k Ω | 0,1W |
| 3016 | 4822 051 20223 | 22 k Ω | 0,1W |
| 3017 | 4822 051 20103 | 10 k Ω | 0,1W |
| 3018 | 4822 100 11842 | 4,7 k Ω | |
| 3019 | 4822 051 20562 | 5,6 k Ω | 0,1W |
| 3020 | 4822 100 11842 | 4,7 k Ω | |
| 3021 | 4822 051 20912 | 9,1 k Ω | 0,1W |
| 3022 | 4822 051 20222 | 2,2 k Ω | 0,1W |
| 3023 | 4822 051 10102 | 1 k Ω | 0,25W |
| 3025 | 4822 051 20104 | 100 k Ω | 0,1W |
| 3026 | 4822 051 20472 | 4,7 k Ω | 0,1W |
| 3027 | 4822 051 20681 | 680 Ω | 0,1W |
| 3028 | 4822 051 20682 | 6,8 k Ω | 0,1W |
| 3029 | 4822 051 20472 | 4,7 k Ω | 0,1W |
| 3030 | 4822 051 20222 | 2,2 k Ω | 0,1W |
| 3031 | 4822 051 20333 | 33 k Ω | 0,1W |
| 3032 | 4822 051 20333 | 33 k Ω | 0,1W |
| 3033 | 4822 051 10102 | 1 k Ω | 0,25W |
| 3034 | 4822 051 20222 | 2,2 k Ω | 0,1W |
| 3036 | 4822 051 20472 | 4,7 k Ω | 0,1W |
| 3037 | 4822 051 20152 | 1,5 k Ω | 0,1W |
| 3038 | 4822 051 20472 | 4,7 k Ω | 0,1W |

Signal panel PMS51/01/02

For WD code WD40 and higher

| | | | |
|------|----------------|--------|------------------------|
| 3039 | 4822 100 11843 | 10 kΩ | |
| 3040 | 4822 051 20222 | 2,2 kΩ | 0,1W |
| 3041 | 4822 051 20472 | 4,7 kΩ | 0,1W |
| 3042 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3043 | 4822 051 20561 | 560 Ω | 0,1W |
| 3044 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3045 | 4822 051 20472 | 4,7 kΩ | 0,1W |
| 3046 | 4822 051 20222 | 2,2 kΩ | 0,1W |
| 3047 | 4822 051 20473 | 47 kΩ | 0,1W |
| 3048 | 4822 051 20473 | 47 kΩ | 0,1W |
| 3051 | 4822 051 20105 | 1 MΩ | 0,1W |
| 3052 | 4822 051 20822 | 8,2 kΩ | 0,1W |
| 3053 | 4822 051 20222 | 2,2 kΩ | 0,1W |
| 3055 | 4822 051 20152 | 1,5 kΩ | 0,1W |
| 3056 | 4822 051 20471 | 470 Ω | 0,1W |
| 3060 | 4822 051 20333 | 33 kΩ | 0,1W |
| 3061 | 4822 051 20103 | 10 kΩ | 0,1W |
| 3062 | 4822 051 20182 | 1,8 kΩ | 0,1W |
| 3063 | 4822 051 20271 | 270 Ω | 0,1W |
| 3064 | 4822 051 20561 | 560 Ω | 0,1W |
| 3065 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3066 | 4822 051 20122 | 1,2 kΩ | 0,1W |
| 3067 | 4822 051 20391 | 390 Ω | 0,1W |
| 3068 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3069 | 4822 051 20561 | 560 Ω | 0,1W |
| 3070 | 4822 051 20391 | 390 Ω | 0,1W |
| 3071 | 4822 051 20681 | 680 Ω | 0,1W |
| 3072 | 4822 051 20271 | 270 Ω | 0,1W |
| 3073 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3075 | 4822 051 20471 | 470 Ω | 0,1W |
| 3076 | 4822 051 20331 | 330 Ω | 0,1W |
| 3077 | 4822 051 20183 | 18 kΩ | 0,1W |
| 3078 | 4822 051 20183 | 18 kΩ | 0,1W |
| 3079 | 4822 051 20473 | 47 kΩ | 0,1W |
| 3080 | 4822 051 20101 | 100 Ω | 0,1W |
| 3081 | 4822 051 20101 | 100 Ω | 0,1W |
| 3082 | 4822 051 20472 | 4,7 kΩ | 0,1W |
| 3083 | 4822 051 20103 | 10 kΩ | 0,1W |
| 3084 | 4822 051 20182 | 1,8 kΩ | 0,1W |
| 3085 | 4822 051 20223 | 22 kΩ | 0,1W (only for SECAM) |
| 3086 | 4822 051 20821 | 820 Ω | 0,1W (only for SECAM) |
| 3087 | 4822 051 20105 | 1 MΩ | 0,1W (only for SECAM) |
| 3088 | 4822 051 20223 | 22 kΩ | 0,1W (only for SECAM) |
| 3089 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3090 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3091 | 4822 051 20562 | 5,6 kΩ | 0,1W |
| 3092 | 4822 051 20332 | 3,3 kΩ | 0,1W |
| 3093 | 4822 051 20152 | 1,5 kΩ | 0,1W |
| 3094 | 4822 051 20222 | 2,2 kΩ | 0,1W |
| 3096 | 4822 100 11842 | 4,7 kΩ | |
| 3097 | 4822 051 20222 | 2,2 kΩ | 0,1W |
| 3098 | 4822 051 20471 | 470 Ω | 0,1W |
| 3099 | 4822 100 11841 | 1 kΩ | |
| 3104 | 4822 051 20472 | 4,7 kΩ | 0,1W |
| 3105 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3106 | 4822 051 20271 | 270 Ω | 0,1W |
| 3107 | 4822 051 20472 | 4,7 kΩ | 0,1W |
| 3109 | 4822 051 20561 | 560 Ω | 0,1W |
| 3111 | 4822 051 20471 | 470 Ω | 0,1W |
| 3112 | 4822 051 20222 | 2,2 kΩ | 0,1W |
| 3113 | 4822 051 20104 | 100 kΩ | 0,1W |
| 3114 | 4822 051 20333 | 33 kΩ | 0,1W |
| 3117 | 4822 051 20183 | 18 kΩ | 0,1W |
| 3118 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3119 | 4822 051 20101 | 100 Ω | 0,1W |
| 3120 | 4822 051 20333 | 33 kΩ | 0,1W |
| 3121 | 4822 051 10102 | 1 kΩ | 0,25W (only for SECAM) |
| 3122 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3127 | 4822 051 20821 | 820 Ω | 0,1W |
| 3128 | 4822 051 20223 | 22 kΩ | 0,1W |

| | | | |
|------|----------------|--------|--------|
| 3129 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3130 | 4822 051 20331 | 330 Ω | 0,1W |
| 3131 | 4822 051 10102 | 1 kΩ | 0,25W |
| 3132 | 4822 051 20681 | 680 Ω | 0,1W |
| 3135 | 4822 051 20104 | 100 kΩ | 0,1W |
| 39xx | 4822 051 10008 | 0 Ω | Jumper |

COILS

| | | |
|------|----------------|--------|
| 5002 | 4822 157 53253 | 27 μH |
| 5003 | 4822 157 53265 | 100 μH |
| 5004 | 4822 157 52842 | 15 μH |
| 5006 | 4822 157 53251 | 8,2 μH |
| 5007 | 4822 157 52842 | 15 μH |
| 5008 | 4822 157 53251 | 8,2 μH |
| 5009 | 4822 157 52842 | 15 μH |
| 5010 | 4822 157 53253 | 27 μH |
| 5011 | 4822 157 52842 | 15 μH |
| 5012 | 4822 157 53265 | 100 μH |
| 5013 | 4822 157 52842 | 15 μH |
| 5014 | 4822 157 53251 | 8,2 μH |
| 5015 | 4822 157 63676 | 56 μH |
| 5016 | 4822 157 53253 | 27 μH |
| 5017 | 4822 157 63676 | 56 μH |
| 5020 | 4822 157 52842 | 15 μH |
| 5021 | 4822 157 52842 | 15 μH |
| 5022 | 4822 157 52842 | 15 μH |
| 5023 | 4822 157 63675 | 330 μH |
| 5024 | 4822 157 63678 | 560 μH |
| 5025 | 4822 157 53253 | 27 μH |

DIODES

| | | |
|------|----------------|--------|
| 6002 | 4822 130 31983 | BAT85 |
| 6003 | 4822 130 30621 | 1N4148 |
| 6005 | 4822 130 30621 | 1N4148 |

TRANSISTORS & IC's

| | | |
|------|----------------|-----------|
| 7000 | 5322 130 41983 | BC858B |
| 7003 | 5322 130 41982 | BC848B |
| 7004 | 5322 130 41983 | BC858B |
| 7005 | 5322 130 41982 | BC848B |
| 7006 | 5322 130 41983 | BC858B |
| 7007 | 5322 130 41982 | BC848B |
| 7008 | 5322 130 41982 | BC848B |
| 7010 | 4822 130 60145 | DTC124EK |
| 7011 | 5322 130 41983 | BC858B |
| 7012 | 5322 130 41982 | BC848B |
| 7015 | 5322 130 41982 | BC848B |
| 7016 | 5322 130 41982 | BC848B |
| 7017 | 4822 130 42353 | BSF19-F2 |
| 7018 | 4822 130 60383 | BF824 |
| 7019 | 4822 130 42353 | BSF19-F2 |
| 7022 | 5322 130 41983 | BC858B |
| 7023 | 5322 130 41983 | BC858B |
| 7025 | 5322 130 41982 | BC848B |
| 7026 | 5322 130 41982 | BC848B |
| 7027 | 5322 130 41982 | BC848B |
| 7029 | 5322 130 41982 | BC848B |
| 7030 | 4822 130 42353 | BSF19-F2 |
| 7031 | 5322 130 41982 | BC848B |
| 7032 | 5322 130 41982 | BC848B |
| 7036 | 5322 130 41982 | BC848B |
| 7038 | 5322 130 41983 | BC858B |
| 7501 | 4822 209 30691 | LA7391A |
| 7503 | 4822 209 60177 | LM339M |
| 7504 | 4822 209 30692 | MSM7403RS |
| 7505 | 4822 209 60376 | LA7311 |
| 7506 | 4822 209 60822 | AN3319S |